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There was still a rich and wide field open for investigation in the study of the Monticuliporidae; and care should be taken first to ascertain with the new and more scientific means the true relations and affinities of the species described previous to 1881.

Mr. Whiteaves exhibited a choice series of recent Polyzoa for comparison with the fossils described in the paper.

Ottawa field-naturalists' club.

Dec. 20.—Mr. James Fletcher read a paper entitled 'Notes on the Flora ottawaensis, with special reference to the introduced plants,' which was explanatory of the lists of plants hitherto published by the club, and in which the non-indigenous species are not indicated. Mr. Fletcher first defined the district from which the plants had been collected, and which lies within a circle of twelve miles radius. He then noted certain of the more interesting of rare or introduced species, and presented lists tabulating the latter plants under the headings of 'Aggressive species,' 'Species able to perpetuate themselves indefinitely,' 'Species dying out after short periods,' etc. An animated discussion ensued, confined principally to the conditions affecting introduced plants, and the spreading of certain species.

Philosophical society of Washington; Mathematical section.

Dec. 19.—Mr. M. H. Doolittle gave a paper on the rejection of doubtful observations, in which observ-

ing-errors were sharply divided into two classes,—those resulting from blunders in recording, pointing on wrong objects, neglect of essential precautions in instrumental adjustment, etc.; and those resulting from an unusual accumulation of similar elements of error. The latter class, because by their magnitude in one direction they indicate that the remaining observations are in error in the opposite direction, he proposed to call *instructive* errors, and claimed that the larger they were the more instructive, and the greater the necessity of retaining them. In practice, however, the best rule with suspected observations is to reject them when they exceed the limit of error possible to the 'instructive' class, and when they fall within it to assign a weight proportional to the chance that the error belongs to the latter class, and not the former. As the law of distribution of the former class of errors (if any such law exist) is very different from the recognized law of the latter class, these questions cannot be decided by computation with a 'criterion,' but must be left to the judgment.

Prof. A. Hall gave as a general result of the debate of this vexed question by Peirce, Airy, De Morgan, Stone, Glaisher, Chauvenet, Gould, Winlock, and others, that *every one can devise a criterion that suits himself, but it will not please other people*. He strongly opposed using such machinery in the discussion of observations as eliminated the knowledge and judgment of the investigator, and giving to results a fictitious accuracy by any sweeping rejection of discordant data.

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

GOVERNMENT ORGANIZATIONS.

Geological survey.

Topographical field-work.—Mr. H. M. Wilson, in charge of one of the topographical parties in Prof. A. H. Thompson's Wingate division, surveyed, during the season of 1883, about ten thousand square miles in north-western New Mexico and north-eastern Arizona. The area covered by his work lies between parallels of latitude 36° and 37° , and extends from meridian 109° to 111° . He also worked some smaller detached areas outside of the limits thus indicated. This region has hitherto remained a *terra incognita*, partly on account of its aridity and barren condition, and partly on account of the difficulty of traversing it. So little has been known of it, that within the area surveyed by Mr. Wilson a small mountain range has been indicated as occupying two places on the same map. On the engineer's map of 1879 it is called Calabesa Mountains in the northern place, and Squash Mountains in the southern; and, on the land-office map for 1882, both are indicated without names. Mr. Wilson's work proves that they are one and the same, occupying a position very close to that assigned to the Squash Mountains.

On the 11th of September Mr. Wilson and one of his men made the ascent of Navajo Mountain (called

by the Indians Nat-sis-aú), and they are probably the first white men who have ever stood upon its summit. Navajo Mountain lies on or near the line between Utah and Arizona, and is a dome-shaped mass rising about four thousand feet above the general level of the surrounding country, and sixty-five hundred feet above the beds of the San Juan and Colorado rivers, which are close to its base, the former on the north, and the latter on the west. Its elevation above sea-level is ten thousand four hundred feet. It slopes abruptly, especially on the east, to a plateau of six to seven thousand feet, which extends south-eastward for fifteen or twenty miles to the cañon where Mr. Wilson left his pack-train in camp. This was on a trail that leads to Fort Defiance, *via* the north side of the Mesa de la Vaca and the valley of the Rio de Chelly. Another trail leads southward to Mo-eu-kap-i (a Mormon settlement) and to Oraybe and the other Moqui villages. From a point a few miles south of the Navajo Mountain, a third trail leads westward to Lee's Ferry, on the Colorado River. Mr. Wilson thinks there is also a trail leading to the mountain from the north-west. He says all the trails in this section are exceedingly rough and difficult to travel, on account of the numerous cañons, of five hundred to a thousand feet in depth, which are cut into the red sandstones (triassic?) that form the

surface-rock of the country. On the summit of the mountain, which is about a mile in length, a brownish sandstone occurs, which may possibly be Jurassic or even cretaceous; but all the rocks are probably referable to the Jura-trias, with the exception of some dark igneous rocks which occur as dikes on the slopes of the mountain. Within about a thousand feet of the summit is a spring of good water, where there is a good camping-place. The slopes are timbered; scrubby firs and balsams occurring on the top, with scrub-oaks below, and tall pines still lower down. Among the latter are many beautiful parks. The plateau-level surrounding the mountain is well covered with fine tall grass, over which are scattered patches of piñon pines and small areas of bare red sandstone.

In the walls of a short cañon on the east side of the mountain, passed through by Mr. Wilson in his ascent, ruins of cliff or cave dwellings were seen in a cave or hollow in the rocks about five hundred feet above the bottom, and a hundred feet below the top.

Ascent of Mount Shasta.—Mr. Clarence King, in his 'Mountaineering in the Sierra Nevada,' says, "There is no reason why any one of sound wind and limbs should not, after a little mountaineering practice, be able to make the Shasta climb. There is nowhere the shadow of danger, and never a real piece of mountain climbing,—climbing, I mean, with hands and feet,—no scaling of walls, or labor involving other qualities than simple muscular endurance."

Mr. Gilbert Thompson, who, during the past summer and fall, spent about two months in topographic work on the slopes and summit of Mount Shasta, endorses this statement of Mr. King, and would add that there is no reason why a train of pack-mules may not be taken to the top of the peak. Mr. Thompson and one of his packers (Thomas Watson), on Sept. 10, 1883, tied their riding-mules to the iron signal-post which marks the extreme summit of the cone, and are the first who have ever taken riding-animals to the top of Mount Shasta. On Oct. 12, 1883, the pack-train was taken to an altitude of 13,000 feet, and would have been taken to the top had not the early snows prevented. Another season, however, Mr. Thompson expects to camp with his entire train upon the summit of Mount Shasta. From one of his camps, at an elevation of 7,400 feet, it required seven hours to go to the top with the riding-animals, while one member of the party, starting from the same camp on foot (taking, of course, a more direct route), reached the summit after a climb of six hours. It took two hours to get back to this camp, and three-quarters of an hour sufficed for the return to the camp which was located at the elevation of 13,000 feet. Mr. King and his party in September, 1870, made the ascent from the north-west. The first day they left their riding-animals at an elevation of about 10,000 feet, and climbed as far as the crater on the north-western spur, which point they reached about half-past one o'clock in the afternoon. They spent the night here, and on the following day, after a climb of four hours and a half, reached the summit. Mr. Thompson's ascent, mentioned above, was along a spur that ex-

tends toward the south-east. Up this spur he says there is a natural trail, only 500 or 600 feet of which will require any work to make it perfectly safe for mules or horses with packs. The route described by Mr. King, and the one *via* a south-western spur, are the routes usually followed by those who make the ascent from Strawberry valley, on the west side of the mountain. One member of Mr. Thompson's party climbed the mountain also from the east, which makes, altogether, four different routes by which it has been ascended. Mr. Thompson says there are two other possible ways by which the mountain can be climbed. These are on the north-east side. He reports, also, that there are seven glaciers located on the north and east slopes of Mount Shasta. Those on the north and north-east are connected at their heads. A north-west and south-east line would divide the glacier-bearing side of the mountain from the non-glacier-bearing half. However, some of the fields of snow and ice on the west side have considerable resemblance to glaciers, and may eventually be so determined.

Mr. Thompson suggests that Mount Shasta would be the best point in this part of the west for a permanent high meteorological station like those located on the summits of Mount Washington and Pike's Peak. Among the several reasons for this opinion, he mentions its accessibility, and the presence of hot-springs, which might be utilized in heating such a station, but more especially the fact that it is an isolated peak, rising high above the surrounding low country, and free, therefore, from the disturbing meteorological conditions induced by the presence of contiguous mountain ranges. Mount Shasta, Mr. Thompson says, does not belong to the Sierra Nevada nor to the Cascade Range, but stands alone.

During the season a line of levels was begun at Berryville, where connection was made with the railroad level, and carried some distance up the mountain. Next year this line will probably be carried to the summit of the peak.

NOTES AND NEWS.

THE Society of naturalists of the eastern United States, whose organization and aims were described in *Science* last spring, held a very successful and interesting meeting at Columbia college, New York, on Thursday and Friday of last week. The attendance was very large, and included many distinguished men. The membership has grown very rapidly, and now includes a large majority of the leading professional naturalists of the eastern states. The papers presented were of a high character, and many of them provoked a discussion such as is rarely heard in any scientific body; for seldom are so many men, devoted to one branch of pure science, gathered together. The communications, almost without exception, referred to problems of practical interest, and dealt especially with methods and the organization of scientific work, and also with methods of teaching.

Upon methods were read several papers, — Pro-